CLAIMS

1. A data transmission packet format for use by a first device communicating in a communication network, the data transmission packet format defined by fields comprising:

source device ID for identifying the first device as a transmission source;

timeslot for identifying the timeslot number currently used by the first device;

neighborhood list for identifying whether at least one other timeslot in the vicinity of the first device has been occupied for transmission by a second device and so as to identify whether the at least one other timeslot is available for a receiving third device.

2. A data transmission packet format as claimed in claim 1 further defined by fields comprising:

destination ID, for identifying the receiving third device which the first device is transmitting information to;

network list, comprising network information for the devices in the network in which the first device is communicating;

data, comprising the payload information being transmitted by the first device;

checksum, for validating the packet received by the third device.

3. A method of data encoding for data packets in a communication network, the method comprising the steps of:

enclosing a data byte with a start bit and a stop bit;

wherein the start bit comprises a first predetermined logic level of a first predetermined duration followed by a transition to a complimentary second predetermined logic level of a second predetermined duration, and;

wherein the stop bit comprises a third predetermined logic level of a third predetermined duration followed by a transition to a complimentary fourth predetermined logic level of a fourth predetermined duration.

4. A method as claimed in claim 3 further comprising the steps of:

sending a start bit prior to sending the first bit of a payload data byte;

sending a stop bit after sending the last bit of a payload data byte.

5. A method as claimed in claim 3 or 4 wherein:

the first and fourth predetermined logic levels comprise a logic level low;

the second and third predetermined logic levels comprise a logic level high; and,

the predetermined durations comprise half of a logic symbol duration.

6. A method as claimed in any one of claims 3 to 5 further comprising the step of:

conditioning a receiver device by encoding preambles and wherein each preamble comprises alternating transmissions of logic level high and logic level low.

7. A method as claimed in any one of claims 3 to 6 further comprising the step of:

sending a start symbol wherein the start symbol comprises the transmission of a continuous logic level for a period of more than two times symbol duration.

8. A method as claimed in any one of claims 3 to 7 further comprising the step of:

scrambling payload data wherein the scrambling comprises performing a predetermined logical operation on each data byte before adding a start and a stop bit.

9. A method as claimed in claim 8 wherein the predetermined logical operation comprises an exclusive OR on each data byte with a value of 202 (CA hexadecimal).

10. A method of synchronizing devices for communicating in a network, the method comprising the steps of:

detecting a start symbol at a receiving device by timing the duration of a logic signal level on a received data transmission;

changing the state of the receiving device upon detecting the start symbol, to a wait state wherein the receiving device waits to receive the start of a payload data transmission in the form of a predetermined logic transition;

adjusting the internal clock of the receiving device immediately upon detecting the predetermined logic transition, so as to synchronize the receiving device with other devices receiving the data transmission within the network.

11. A method as claimed in claim 10 wherein the received data transmission is encoded in accordance with a method as claimed in any one of claims 3 to 9.

12. A method of dynamically allocating a timeslot for a receiving device in a communication network, the method comprising the steps of:

receiving a data transmission from the network;

copying a received timeslot from the data transmission;

copying a received neighborhood list from the data transmission;

searching the received neighborhood list for an unused timeslot in accordance with a predetermined logical search strategy so as to locate and allocate a timeslot to the receiving device.

13. A method as claimed in claim 12 further comprising the step of providing access to the network for the receiving device in the event that an unused timeslot is located and allocated to the receiving device and,

wherein the receiving device is operated in a Normal mode where during its own timeslot for transmission the device transmits.

14. A method as claimed in claim 13 further comprising the step of operating the receiving device in a Normal/Listen mode in the event that an unused timeslot is not located or allocated to the receiving device, wherein the Normal/Listen mode is such that during its own timeslot for transmission, the receiving device activates its receiver and not its transmitter.

15. A method of providing network access for a device adapted to receive data, the method comprising the steps of:

receiving a data packet formatted as in claim 1 or 2 from a transmitting device;

processing the received data packet as follows:

copying the received neighborhood list;

copying the received timeslot;

forming a network with the device and the transmitting device if the device does not have any neighbor and is not in network;

determine a dynamic allocation of a timeslot in accordance with a method as claimed in claim 12, 13 or 14 based on the following predetermined criteria:

a) if the device is not in network and its ID value is less than the transmitting device's ID, perform a dynamic allocation of a timeslot;

b) if the device is not in network and the transmitting device is in network, perform a dynamic allocation of a timeslot;

c) if the device and the transmitting device are already in a network, do not perform a dynamic allocation of a timeslot.

16. A protocol for dynamically expanding a network of communicating devices, the protocol comprising the following states of operation:

sleep, wherein a device's transmitter and receiver are inactive and the device is waiting for an external trigger;

wake up, wherein a device's transmitter and receiver are enabled by an external trigger;

scan, wherein a device's receiver is continuously receiving such that it scans for transmissions from other devices;

listen, wherein a device is allocated a timeslot, synchronized to the timeslots of other devices, and such that the device only has its receiver operating during its allocated timeslot;

normal, wherein a device is allocated a timeslot without being synchronized to the timeslots of other devices and, such that the device transmits during its allocated timeslot and receives during every other timeslot;

network, wherein a device is allocated a timeslot for receiving and for transmitting and synchronized to the timeslots of other devices in the network.

17. A protocol as claimed in claim 16 further comprising :

a wake up timer;

a scan timer;

a listen timer;

a normal timer;

a network timer.

18. A protocol as claimed in claim 17 wherein the scan state comprises the following transitions:

the device detects transmissions from other devices and is able to be allocated a timeslot for itself and gain access in accordance with a method as claimed in claim 15, start a network timer and enter the network state;

the device detects transmissions from other devices, determines there are no timeslots to allocate, starts a listen timer and enters the listen state;

a scan timer expires and no other devices are detected defining no neighbors, a normal timer is started and the normal state is entered.

19. A protocol as claimed in claim 17 or 18 wherein the listen state comprises the following transitions:

the device detects that a timeslot is available for allocation due to a sleep state being invoked by one or more other devices, allocates the timeslot, enters the network state and a network timer is started before leaving the listen state;

a listen timer expires and no timeslot is available, a normal timer is started and the device leaves the listen state and enters the normal state.

20. A protocol as claimed in any of claims 17 to 19 wherein the normal state comprises the following transitions:

the device detects newly transmitted messages from other devices, a network timer is started and the device enters the network state;

the device does not detect any transmissions from other devices and remains in the normal state;

a normal timer expires, the device disables it transmitter and receiver, starts a wake up timer and enters the wake up state.

21. A protocol as claimed in any of claims 17 to 20 wherein the network state comprises the following transitions:

a network timer expires, the device disables all communications, powers down, starts a wake up timer and enters the wake up state so as to allow other devices to be allocated the timeslot it has occupied;

the number of neighbor devices in the network drops to zero, the device starts a scan timer and enters the scan state.

22. A protocol as claimed in any of claims 17 to 21 wherein the timers have a duration and expiry time that differs for each instance of the timers being started in the given states.

23. Apparatus adapted to format a data packet, encode data, synchronize devices, dynamically allocate a timeslot, provide network access,

or provide a protocol for dynamically expanding a network, said apparatus including:

processor means adapted to operate in accordance with a predetermined instruction set,

said apparatus, in conjunction with said instruction set, being adapted to perform the method as claimed in any one of claims 1 to 22.

24. A computer program product including:

a computer usable medium having computer readable program code and computer readable system code embodied on said medium for any one or more of formatting a data packet, encoding data, synchronizing devices, dynamically allocating a timeslot, providing network access, or providing a protocol for dynamically expanding a network, within a data processing system, said computer program product including:

computer readable code within said computer usable medium for performing the method of any of claims 1 to 22.

25. A method or protocol as herein disclosed.

26. An apparatus or product as herein disclosed.